SMiP Foundations 2: Multinomial-Processing-Tree Modeling
Basic Methods and Recent Advances
(Edgar Erdfelder & Daniel W. Heck)

Workshop Day 1: Essentials of MPT Modeling (Tuesday, May 10th, 10:00-17:00, SO 418)

- 10:00 – 11:15 Basics (Instructor: EE)
    - Introduction to standard MPT models (logic, examples, advantages, limitations)
    - Model development (model construction, paradigm, data structure, identifiability)
    - Parameter estimation (maximum likelihood, minimum χ^2, power-divergence statistics)
    - Model assessment (G^2, Pearson's χ^2, and the PD$^\lambda$ family of goodness-of-fit statistics)
- *Break*
- 11:30 – 12:30 Application I (Instructor: EE & DH)
    - Introduction to multiTree: EQN syntax, data files, batch analysis
    - Practical exercises
    - Order constraints
- *Noon Break*
- 13:30 – 15:00 Advanced features of multiTree (Instructor: EE)
    - Identifiability concepts and checks provided by multiTree
    - A priori and post hoc statistical power analyses
    - Model selection (AIC, BIC, NML, and FIA criterion)
- *Break*
- 15:15 – 17:00 Application II (Instructor: EE & DH)
    - Workflow with multiTree: Developing and testing a new MPT model
    - Using advanced features in multiTree
    - Optional: Testing interactions (EE)

Workshop Day 2: Advances in MPT Modeling (Wednesday, May 11th, 9:00-16:00, SO 318)

- 9:00 – 10:15 Bayesian hierarchical MPT modeling (Instructor: DH)
    - MPT models & heterogeneity
    - Hierarchical MPT models
    - Bayesian estimation with MCMC sampling
    - Adding continuous covariates
- *Break*
- 10:30 – 12:00 Application III (Instructor: DH)
    - Practical exercises on hierarchical MPT modeling using TreeBUGS
    - Basics: Model fitting, convergence, plots, model fit
    - Advanced: Within-/between-subject comparisons, covariates, simulation
- *Noon Break*
- 13:00 – 14:00 Overview of mixture models for continuous data (Instructor: DH)
    - Modeling response times with histograms (MPT-RT)
    - Parametric modeling with generalized processing trees (GPT)
    - Serial process model for response times (RT-MPT)

- *Break*
- 14:15 - 16:00 Application IV (Instructors: DH & EE)
  - Questions and answers
  - Developing and testing (new) models suggested by the participants